



U. S. Chemical Safety and Hazard Investigation Board

RECOMMENDATIONS STATUS CHANGE SUMMARY

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| Report: | Hoeganaes Corporation Fatal Flash Fires |
| Recommendation Number: | 2011-4-I-TN-R6 through R9 |
| Date Issued: | January 11, 2012 |
| Recipient: | Hoeganaes Corporation |
| New Status: | R6: Open – Unacceptable Response R7: Open – Acceptable Response R8: Open – Acceptable Response R9: Open – Acceptable Response |
| Date of Status Change: | June 1, 2015 |

Recommendation Text:

2011-4-I-TN-R6:

Conduct periodic independent audits of the Hoeganaes Gallatin facility for compliance with the following NFPA standards, using knowledgeable experts, and implement all recommended corrective actions:

- *NFPA 484, Standard for Combustible Metals, Metal Powders, and Metal Dusts*
- *NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous Locations for Electrical Installations in Chemical Process Areas*
- *NFPA 497, Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*
- *NFPA 2, Hydrogen Technologies Code*
- *NFPA 2113, Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*

2011-4-I-TN-R7:

Develop training materials that address combustible dust and plant-specific metal dust hazards and train all employees and contractors. Require periodic (e.g. annual) refresher training for all employees and contractors.

2011-4-I-TN-R8:

Implement a preventative maintenance program and leak detection and leak mitigation procedures for all flammable gas piping and gas processing equipment.

2011-4-I-TN-R9:

Develop and implement a near-miss reporting and investigation policy that includes the following at a minimum:

- *Ensure facility-wide worker participation in reporting all near-miss events and operational disruptions (such as significant iron powder accumulations, smoldering fires, or unsafe conditions or practices) that could result in worker injury;*

- *Ensure that the near-miss reporting program requires prompt investigations, as appropriate, and that results are promptly circulated throughout the Hoeganaes Corporation;*
- *Establish roles and responsibilities for the management, execution, and resolution of all recommendations from near-miss investigations;*
- *Ensure the near-miss program is operational at all times (e.g. nights, weekends, holiday shifts).*

Board Status Change Decision:

A. Rationale for Recommendations

Between January and May 2011, the CSB investigated three iron dust-related incidents at the Gallatin, Tennessee facility of the Hoeganaes Corporation, a worldwide producer of atomized iron and steel powders. The first incident, an iron dust flash fire incident killed two workers; the second injured one. The third incident was a hydrogen explosion that triggered iron dust flash fires, claiming three lives and injuring two other workers.

The CSB reviewed Hoeganaes corporate and facility safety policies, procedures, and practices and identified a number of deficiencies which contributed to these incidents. Notably:

- Hoeganaes facility management did not mitigate the iron powder combustibility hazard through the use of engineering controls and housekeeping procedures.
- Hoeganaes did not sufficiently train employees to understand the potentially severe consequences of combustible dust dispersion and to report minor flash fires and near misses that periodically occurred for prompt investigation.
- Hoeganaes did not institute safe procedures such as combustible gas monitoring and employee training to avoid flammable gas fires and explosions.

The CSB issued four recommendations to Hoeganaes Corporation to conduct independent audits of the Gallatin facility, develop and conduct training on combustible dust, implement a preventative maintenance program, and develop and implement a near-miss reporting program.

B. Response to the Recommendation

Recommendation 2011-4-I-TN-R6: Hoeganaes has conducted several audits of the Gallatin facility since the issuance of the CSB recommendation, but has not demonstrated that the audits fully addressed compliance with the five NFPA standards listed in the CSB recommendation.

Recommendation 2011-4-I-TN-R7: Hoeganaes indicated that it conducts combustible dust training for all Hoeganaes facilities for all employees and contractors, and that the training materials are periodically reviewed and updated as necessary.

Recommendations 2011-4-I-TN-R8: Hoeganaes indicated that they have corporate-wide policies for preventative maintenance in accordance with the CSB recommendation, and that employees and contractors receive training that is periodically reviewed to ensure that it is up to date.

Recommendations 2011-4-I-TN-R9: Hoeganaes issued near miss reporting policy that outlines the requirements for employees and supervisors to report near misses. Hoeganaes also maintains a portal IT system that allows any employee in any Hoeganaes Corporation facility to enter a near miss at any time, and near misses are communicated to appropriate personnel automatically and the issue is tracked to completion.

C. Board Analysis and Decision

As Hoeganaes has conducted several audits of the Gallatin facility since the issuance of the CSB recommendation, but after several requests by CSB staff, has not demonstrated that the audits comprehensively address compliance with the five NFPA standards listed in the CSB recommendation, the Board voted to change the status of CSB Recommendation No. 2011-4-I-TN-R6 to **“Open – Unacceptable Response.”**

As Hoeganaes has indicated that combustible dust training is conducted for all Hoeganaes facilities for all employees and contractors, but has not yet provided documentation that the training is conducted at all facilities, the Board voted to change the status of CSB Recommendation No. 2011-4-I-TN-R7 to **“Open – Acceptable Response.”**

As Hoeganaes has indicated that they have corporate-wide policies for preventative maintenance in accordance with the CSB recommendation, but has not yet provided documentation of such corporate policies to the CSB, the Board voted to change the status of CSB Recommendation No. 2011-4-I-TN-R8 to **“Open – Acceptable Response.”**

As Hoeganaes issued a near miss reporting procedure and maintains an IT system to ensure that near misses are reported and tracked to resolution, but has not provided evidence that near misses have been reported and resolved through the system, the Board voted to change the status of CSB Recommendation No. 2011-4-I-TN-R9 to **“Open - Acceptable Response.”**